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PREFACE

CONTINUING PROGRESS ON A NATIONAL TRANSIT PLANNING AND RESEARCH AGENDA

This is the third in a series of documents that report the continuing development of the Federal Transit Administration's National Transit Planning and Research (TP&R) Program agenda. This volume reports the results of the third Transit Planning and Research Priorities Workshop, held in Tysons Corner, Virginia, on July 15 and 16, 1992. This workshop was a continuation of the aggressive and expanding outreach program conducted by the Federal Transit Administration to assure a vital and cost efficient research program that is responsive to constituent needs.

The Workshop built upon the solid foundation of the two previous workshops and advanced the mandates of the National Transportation Policy and the Intermodal Surface Transportation Efficiency Act.

THE WORKSHOP

The research suggestions of the two previous workshops were further refined. As before, the Workshop was well attended, with 175 representatives of the transit community representing operating agencies, government, academia, constituent interest groups, and others. The participants were charged to:

- o Review and critique FTA's proposed 1993 planning and research programs; and
- o Review the draft version of FTA's Six Year Plan, and suggest revisions as needed.

TARGET MARKETS

The Workshop was organized around six target markets designed to reflect industry needs, professional interests of the participants, and markets served by the products and services of the TP&R Program. A sixth market area, (in the previous workshops there were only five) Advanced Public Transportation Services, was added based on recommendations from the last workshop. These target markets are:

1. Advanced Public Transportation Systems;
2. Engineering;
3. Finance;
4. Management;

5. Planning; and
6. Services.

The deliberations and conclusions of the Workshop were developed in concurrent breakout sessions organized around these six target markets. Each workshop session was led by a chair-person who was not from the Federal government who was supported by a co-chair from FTA. The chair-person was given flexibility for organizing and guiding the session. Each group determined its own scoring and prioritizing processes for developing its recommendations. Due to this flexibility there is some overlap in recommendations, and the summaries vary in style and content.

WORKSHOP RESULTS

The activities, findings and conclusions of each target market session, as reported by the chair-person and the technical report developed at each session, are summarized below.

ADVANCED PUBLIC TRANSPORTATION SERVICES

Advanced Public Transportation Services were separated from the services market segment in order to address this emerging area of interest. APTS taken as a separate area highlights the potential for cross cutting issues and synergy of approach. This group reviewed the Six Year Plan and revised the program goal to "build a body of information on how to effectively and efficiently enhance public transportation". Based on this goal, the group ranked the following as high priority projects;

- o Evaluation of APTS Applications;
- o Facilitation of APTS Technical Working Groups;
- o California Smart Traveller;
- o Smart Bus Projects;
- o Multi-Use Smart Card Systems;
- o Human Factors Considerations;
- o Smart Traveller Projects;
- o Mobility Manager;
- o Telecommunications Technology Support;
- o Technology Sharing;
- o Technical Assistance; and
- o Identification and Cataloging of Available Technologies.

Integration was the most common theme, as APTS technologies are only as useful as their appropriate application.

ENGINEERING

The clients in this target market segment are the general managers, capital program managers, engineers, specifications writers, designers, procurement officials, and construction managers of the nation's transit systems and the consultants and suppliers that serve them.

The engineering session covered three broad subject areas: Clean Air, Technology Development, and Transit Accessibility. These were evaluated using the six criteria identified as critical by the Federal Advisory Committee:

- o Reduced maintenance/operation costs;
- o Increased ridership, enhanced safety and security, improved access;
- o Implementation of mandated legislative programs;
- o Reduced weight and improved efficiency of vehicles;
- o Technology transfer and information dissemination; and
- o Control of capital costs.

By review, rating, and ranking, the session identified the 14 top priority projects:

- o Fuel Cell/Battery Bus Development;
- o Light Weight, 40 Foot Bus;
- o Advanced Technology R&D;
- o Research to Improve Accessibility;
- o Electric Energy Cost Reduction for Rail;
- o Light Weight, Small Bus;
- o National Easter Seals Project;
- o Computer Modeling of Train Operations
- o Develop ATCS Interactive with
Passenger Information Systems and
MIS;
- o Lower Emissions Project;
- o Non-Destructive Test and Evaluation;
- o Establish Fuel Standards;
- o Maintenance Cost Reduction for Rail; and
- o Expert System Support for Operations and
Maintenance on Rail.

FINANCE

The activities associated with this market segment include financial planning, value capture, joint development, broad-based taxes, innovative financing, tax increment, bond financing, cross-border leasing, private equity, tolls, lease purchase agreements, other multi-source arrangements and cost reduction techniques involving shared construction and enhanced management systems.

The clients in this area include all Federal, state and local officials involved in funding transit. Administrator Clymer briefed the participants on the impact to financing transit of the advanced Federal draw down that recognizes the promise of matching funds, and Like/Kind exchange that allows money from the sale of used vehicles (which were paid for in part by Federal funds) to be used as the local match for the purchase of similar vehicles.

The Six Year Plan was reviewed.

MANAGEMENT

The activities in this market area include human resources, safety and security, and information systems. TP&R projects serve activities related to day-to-day managerial functions of personnel administration including human resources and labor management; drug, alcohol and employee assistance programs, and safety and security of personnel and riders.

The clients in this market segment include all policy and professional officials responsible for providing day-to-day safe, reliable, convenient and affordable transit.

The group evaluated the Six Year Plan areas of Human Resources, Safety and Security, and Information. The group decided to add a new category, Management, to represent the needs of transit managers. After discussion, rating and identification of new candidates, 24 projects were identified. The top ten were:

- o Safe handling of Alternative Fuels;
- o TSI Course Development;
- o Impact of ADA on Transit Employment;
- o System Safety Curriculum Upgrade;

- o Training Program for Transit Impact on the Environment;
- o Enforcement Strategies for Drug and Alcohol Abuses;
- o Standardized Safety Components for Buses;
- o Employee Fitness for Duty Testing;
- o Police Management Training in Innovative Security; and
- o Review and Evaluate Fire Detection Suppression Systems.

These projects suggest cross cutting issues in the areas of information, management and safety and security. It was apparent to the group that management had to emerge as a separate category that is affected by virtually all Six Year plan areas.

PLANNING

This target market session included planning and analysis activities leading to the implementation of capital investments for transit systems. These activities address intermodal trade-offs, land use and air quality planning, alternatives analysis, demand forecasting, cost estimating and financial planning.

The clients for the TP&R products are the public officials with authority to approve and fund major capital projects and systems and the private sector suppliers of planning, engineering, system technologies, financing and management support services.

SERVICES

This market segment encompasses the entire regional mobility program: transportation demand management, innovative transit services, rural transportation, entrepreneurial services and competitive services.

Review of the Six Year Plan highlighted four suggestions concerning the way mobility is addressed:

- o Emphasize the social and economic benefits of improving mobility, focus on moving people, not just moving vehicles.
- o Need to integrate public transportation with development.

- o Artificial distinctions between rural, suburban and urban issues need to be avoided.
- o Improvements in service quality should be emphasized along with increased productivity and cost effectiveness.

In reviewing the proposed Fiscal Year 1993 agenda, the group suggested the following priorities:

- o Transportation Demand Management Program Support;
- o National Center for Regional Mobility;
- o Joint FHWA/FTA Operational Action Program;
- o Evaluation of TDM Project Effectiveness;
- o Consortium for Regional Mobility;
- o Transit-Oriented Land Use Practices Documentation;
- o Employer-Supported Transportation Demos;
- o Charter Bus Demonstration Support;
- o Congestion Pricing Studies and Demos;
- o Telecommuting Assessment;
- o Transportation Allowance;
- o Centralized Automated Trip Planning;
- o "Weed and Seed" Program;
- o Support for the National RTAP Program;
- o Minnesota Dial-A-Ride Technology;
- o Multi-State Transportation Coordination Initiative; and
- o Kansas Statewide Coordination.

ADVANCED PUBLIC TRANSPORTATION SYSTEMS (APTS) BREAKOUT SESSION

Chair-person: Gorman Gilbert, Director, University
Transportation Center, North Carolina State
University

FTA Co-Chair: Ronald Fisher

Facilitator: Katie Turnbull, Texas Transportation Institute,
Texas A. & M. University

FTA Staff: Ronald Boenau

Gorman Gilbert introduced himself, the co-chair, the facilitator and the coordinator. Ron Fisher summarized the APTS Program, reviewed the goal and objectives of the Program and presented the APTS Program components:

- o Assessments of APTS technologies;
- o Research of technology adaptations;
- o Operational tests;
- o Evaluation;
- o Technology sharing; and
- o Development of user requirements and equipment standards.

There was a discussion of the program goal. One suggestion was to change the goal to, "to build a set of replicable models". This led to the question "would you eliminate evaluations from the goal of the APTS Program?" The answer was no, and a further suggestion was to have a more focused goal rather than just on the body of information. The group decided to add the words "access to the knowledge" to the goal. This resulted in a new goal, "to build a body of information on how to effectively and efficiently enhance public transportation, and to access this knowledge".

Another question that related to the goal was as follows, "since specific technology will be generated in narrow areas, how will these integrate together?" The response to this question was that APTS is focusing on information technology in the five to ten year range, not in a long-term time frame. A follow-up question was: are we trying to develop an information base or technologies?

It was suggested that more dollars be spent on operational tests as opposed to the assessment of available technologies. There was a discussion about how state DOTs can look for opportunities in APTS. It was suggested that an important element of the Six Year Plan is the leadership role for the program which may suggest how state DOTs fit in. Also, the use of existing technology in other applications should be a major element of the plan; for example, the use of smart cards in banks and automated toll collection.

The group then began to discuss the projects suggested for possible implementation during fiscal year 1993. The discussion began with eight projects under the heading of "Assessment of APTS Technologies". The following are some of the projects as well as comments.

1. Identification and Cataloging of Available Technologies- There was a concern that this be updated regularly and that the information be published on-line. This on-line information could be posted in the IVHS America's Clearinghouse, which is developing an electronic bulletin board including interactive capability. When it is available, people will have to subscribe in order to use it. There is also a publicly-funded bulletin board, which you cannot talk to. It was thought that a transit agency would not make use of the IVHS bulletin board and that the information needs to be in a more commonly used database. Several participants thought that if this is an on going project, \$80,000 will not be enough. Since start-up costs and maintenance would add significantly to the cost, \$80,000 might be reasonable if it is for after start-up.
2. Benefits Assessments of Technologies - This involves developing a family of technologies, implementing them in transit operations and asking what are the benefits. For instance, if you apply advanced vehicle locating and monitoring (AVL/M) technology, what are the benefits likely to be? It was suggested that there are not enough operational tests to do this. It was suggested that "functional" assessment would be a better term than "benefits" assessment. Another suggestion was to zero fund this project, as the first project, Identification and Cataloging of Available Technologies, has to precede this project. Maybe the APTS Committee should be used to do that first cut of technologies.
3. and 4. State-of-the-Art Assessment and Evaluation Testing of Navigation Technologies - Ron Fisher stated that these projects would not repeat what FHWA is doing. In this project different navigation technologies will be tested and evaluated in transit operational tests. It was asked if a cost/benefit analysis had been done. A suggestion was made to combine these with the Smart Bus Projects by adding signpost technology and expanding that list of project locations and at the same time assess technologies that relate to each other. It was stated that this project should include an understanding of where navigation technologies are right now. There was a discussion of the usefulness of navigation technologies for fixed route systems. It was suggested that this technology be limited to flexible route

systems. It was also suggested that the technology be called advanced vehicle location (AVL) rather than navigation. It was mentioned that the Toronto Ministry of Transport has already done research in this area.

There was a concern about AVL and its application to flexible and fixed route transit. The potential benefits are substantially different between the two. It was suggested that flexibly routed, fixed-route transit is important, particularly during low demand periods. One participant stated that this should be a rigorous and neutral assessment, and should identify what the costs will be. It was also suggested that IVHS technology ought to increase the advantage of flexible routes, particularly in improving timed transfers and redesigning systems.

5. Evaluation of Operational APTS System - Several questions were raised, such as what system are we talking about, and where does this fit into the evaluations? It was suggested that this project is akin to what the Volpe Center is doing in Denver. Another question was asked as to what the deliverables would be. It was suggested that there be consideration given to generating a standard.
6. Smart Card System for Multi-Purpose Use - It was suggested that while this project was worthwhile, larger companies may be looking at this. It would be good to tap into their knowledge base. One suggestion was to obtain information on this project from vendors and use an independent contractor to evaluate this information. One issue not addressed in this project is the integration of the fare collection process into banking technology. This could be useful in the long and short term. There are a lot of different cards such as debit cards, smart cards and credit cards. One of the leading regional banking networks has concluded that multi-purpose smart cards will be used in transit as a beginning point. There are currently three transportation-related experiments in the pilot stages in Europe (Switzerland and Germany). Market testing might be done by a large company, using a transit property as a test case. Experience with a regional automatic toll, collection card suggests that there are significant costs in building the mechanism to get a dollar fare to the bank. This should be recognized in the research. Other ideas that were suggested for inclusion in this project were (1) the exploration of how the transit industry can get involved in the electronic banking system, (2) the planning implications of this technology (e.g., in terms of things like origin and destination surveys), (3) the growing

consumer resistance to using personal information on travel patterns, and (4) freedom of information implications. It was suggested that all soft science issues be explored.

7. Identification of Technical and Institutional Issues - It was suggested that the technical issues are already being covered, so it would make sense to only look at the institutional issues. It was also suggested that this be broadened to include legal issues.
8. Technical Assistance - The smaller properties do not have the money to hire consultants, so this project could be used to help them. It was suggested that procurement advice should be included in this project. The Volpe Center has specialists in several areas; these resources could be utilized on a short-term basis.
9. Human Factors Considerations - It was stated that this project would include study of one or more of the items in the project description. For instance, specific displays and how they would be used could be assessed. The impact on staff and the general public of the introduction of advanced technology into public transit is very important. This project would include site-specific studies. It was suggested that there be comprehensive coverage for APTS, rather than doing a specific human factors assessment. In Denver, Trimble Navigation is already doing some assessment using a software simulator to catalog the reactions of operators to the new technology (AVL). Tri-Met in Oregon is building a new dispatch center with both fixed-route and paratransit operations in it, but is not sure how close to make them.
10. Telecommunications Technology Support - It was a general consensus that transit should have more of the bandwidth. There is a need to try to identify transit spectrum requirements in contrast to what is available today. There is also a need to look at spectrum planning for all modes of transportation, including transit. It was decided that the project be renamed Spectrum Allocation Needs Support. A question that was asked regarding this project was: FHWA will spend \$20 million on architecture needs, so does FTA need a project? Evidently, under the user requirements technical working group, one subgroup intends to work on this issue. The results of this project should be coordinated with FHWA and other IVHS interests.
11. Specific Research Efforts - It was suggested that this effort focus on well defined research, not on a broad identification of the issues. It was suggested that

this project assess the linkages between smart vehicles and regional traffic management.

12. Evaluation - There were no specific projects listed under evaluation. There was a discussion about how this project area ties into the operational tests area. Ron Fisher explained that evaluations are to be done separately.
13. Technology Sharing - It was questioned as to who would do this. The answer was given that it would be an effort through the Volpe Center, the Public Private Transportation Network, and the TTS Information Program. The relationship with the IVHS Clearinghouse was discussed and the group was told that FTA planned to fund one full-time person at IVHS America. This project is expected to result in electronic bulletin boards, cross-cutting studies, and coordination with the agendas of TRB, ITE, ASCE and APTA meetings. There was discussion of the proliferation of technology transfer devices; FHWA has 50 technology transfer centers. It was suggested that there is a need for a separate study on technology transfers and identification of a method of information dissemination.
14. Development of User Requirements and Equipment Standards - One project in this effort "Facilitation of APTS Users and Industry Technical Working Groups" would focus on inter-industry applications. The only focus on transportation applications is in the European community. It was suggested that the group stay in touch with what the Europeans are doing. Conversely, it was suggested that European standards are not necessarily compatible with those in the United States, so the European focus may not be correct. It was suggested that there was too much money allocated to this project. In response to this comment it was explained that the user requirement group has spawned four subgroups: smart cards/tags, bus local area network, human factors and structure utilization. The Volpe Center supports these committees.

There was a brief discussion about the five Operational Tests: California Smart Traveler, Bellevue Smart Traveler, Smart Bus projects, Twin Cities Smart Traveler and Mobility Manager. These projects are basically continuations of current work. In the California Smart Traveler Project, the objective is to finalize demonstration designs and to perform two operational tests (ridesharing and pre-trip planning). The intent is to build an open system architecture.

It was suggested that funding be taken from the first group of projects (assessments of APTS technologies) and given to

operational tests. There was a question on the mobility manager project as to how it fits in with standards and user requirements. No mobility manager systems are fully operational yet; everything is in the concept stages. The only project that has started is in Medford, OR. which is a multi-operator environment involving coordination and the implementation of several advanced technologies.

It was discussed whether Section 3 money should be used for the capital costs for APTS projects whenever possible. It was noted that it is a competitive source of funding. There was also a comment regarding how the corridors projects might reflect a transit component. It was suggested that a research agenda be prepared to seek corridors money. The APTS Program Plan, which will be prepared as a result of this meeting, will be the agenda for the corridors proposals. There is good cooperation between FHWA and FTA in developing multi-modal projects in the IVHS corridors.

There was a discussion about how the results of this meeting will be reflected in FTA program and budget. Ron Fisher stated that the results of this meeting will provide guidance in setting up the final program and budget. It was also stated that there are two unknowns: Congressional earmarks and the corridors projects.

In terms of new projects, the group identified an additional 37 projects for FY 1994-95, resulting in a total of 50 future projects. The group then began discussing the proposed projects. It was suggested that the IVHS "Impact on Ridesharing" project be narrowed down to real-time ridesharing. It was suggested that the Multi-use Smart Card project be combined with the RF Smart Card Project. It was suggested that the private sector fund its own demonstrations. It was further suggested that the name of "Multi-Use Smart Card" project be changed to "Multi-Use Electronic Fund Transfer." Electronic fund transfer should be considered on buses in the RF Smart Card project. It was suggested that the term should be "fund transaction" rather than "fund transfer". Electronic fund transfer has some interest because of other projects, such as hands-free systems. The last comment was that the Maps on a Disk are already available.

In discussing the future projects (see list at the end of this chapter) it was suggested that several projects be combined that dealt with similar subjects. These were as follows:

Projects 3, 8, 18, and 22 (and possibly 24), all dealing with customer information systems, could be combined. Projects 1, 2, 9, 26, 27, 34, 36, 41, 44 and 48 should be combined; they all deal with Smart Cards. In discussing these projects, it was suggested that there be a multi-use focus to these projects, where many Smart Card applications are considered. It was then suggested that these projects should look at limited market application first before expanding to look at multi-uses beyond

transportation. Projects 28 and 43 should be combined, they both deal with timed transfers. There was a question about whether projects 6 and 7 should be combined, since they are part of the overall APTS evaluation effort.

Other discussions included the accuracy of information provided at a kiosk, which may be provided by the private sector, but reflects on the agency whose information is being displayed. Project 19, Media Use of IVHS, may address this issue. It was suggested that standards, which are mentioned in Project 15 (APTS Standard Databases/Software), should consider compatibility across systems and agencies. For example, could someone using a ADA paratransit system with a Smart Card be able to go to another location or system and use the same card on a telephone reservation system? This idea suggests a standard interface with a standard data flow. It was mentioned that in the New York metropolitan area, which has the New York Thruway, the Garden State Parkway and the Pennsylvania Turnpike, electronic toll collection (ETC) protocols are common, even though the systems themselves are different.

Ron Fisher suggested that an important recommendation of this group might be to identify areas in which there is a need for standards related to the operational tests. This should be an underlying principle in how to guide and evaluate the APTS Program.

It was suggested that Project 4, IVHS Impact on Ridership, may not be a feasible project. Gorman Gilbert raised a concern that there is not enough emphasis on interfacing transit data with traffic management centers. A lot of money is being spent on traffic control centers, and transit is not well represented in these efforts. It will be important to address the linkages of paratransit and transit with traffic control centers.

A 51st future project was suggested - Guidelines for Integrating Transit into Transportation Management Centers. It was suggested that a set of specifications be developed to include transit in a control center. It was also suggested that the influence on modal choices should be considered in this project. An example of this was after the San Francisco earthquake when traffic managers had to become transit managers in order to direct people to public transportation options which were the only available modes of transportation in most cases. There is also a parallel in paratransit scheduling and AVL: highway travel times are needed for paratransit scheduling and AVL provides the feedback loop. This project should also involve issues about whether transit operations control should be co-located with traffic management control.

It was mentioned that FHWA has sponsored a number of research projects to study human factors, such as the issue of co-location. It was also suggested that intermodal connections and opportunities should be considered in all operational tests.

One suggestion was that three projects be kept separate - transit-specific, multi-use (high-visibility), and RF Smart Card projects. Further, it was suggested that transit security/fraud issues be included in the operational tests.

It was suggested that Project 5, Suburban IVHS Implementation, is already covered in other projects. It was suggested that there is a category of paratransit and route-diversion projects, therefore, Project 5 should be combined with Projects 17 and 42. Another issue that was raised was whether the issue of suburban mobility should be included in the APTS focus. It was further suggested that Projects 17 and 42 be kept together, but that Project 5 should be eliminated. Maybe the focus of FTA should be on mobility rather than transit, so that issues such as personal trip needs could be examined in APTS. It was suggested that Projects 18 and 24 incorporate these ideas. It was suggested that there should be an expansion even further beyond the regional perspective (there is some experience in the Los Angeles basin area with this regional issue). However, this would be a huge database if travel to other states were included. Ron Fisher stated that there is already a vendor that provides this type of information. There was a question as to whether it is important to be able to develop an itinerary for travel across regions.

A more detailed description of Project 17 was then given: to design a test, field a fleet and manage dynamically changing routes and schedules with the use of AVL. The result of the test would be to determine if the technology would aid in the changing of schedules. This led to a question about whether Projects 17 and 42 should be "Phase II" of the smart vehicle projects, or whether fixed-route and demand-responsive should be kept separate.

There was a discussion of project 49. It was stated that as congestion becomes worse and peak hours becoming broader, goods movement and transit begin to conflict. This idea should be addressed somewhere. It was suggested that there are examples in every metropolitan area of this type of situation. This project addresses the concept that because courier and delivery companies operate large fleets, empty seats could be linked electronically in order to move people and packages simultaneously. AVL could also be part of this project. There is a courier in the Tysons Corner area that may try out this concept. This demonstration project would show that vehicles can be used more efficiently. The concepts for software are identical whether moving people or passengers. In this concept, the service would be provided to passengers free. There was a suggestion that the IVHS application focuses on the competition for limited facilities, in which there could be a shift to and from commercial vehicles and transit vehicles. It was asked if this could be a subcategory of real-time ridesharing, but since it is different conceptually (a person initiating and making a ridesharing decision versus a service

being provided through an employer), it could not be a subcategory of real-time ridesharing. This project focuses on the multiple use of a vehicle. It was stated that FHWA and FTA have shown an interest in this project.

The discussion was then redirected to suggest candidate future projects that should be moved to the list of FY 1993 projects because of a time-sensitive need for the project to be implemented earlier. One example is Project 51. In looking at other operational tests, it was suggested that the system architecture should be a parallel effort with FHWA, since it has started already. It was decided that Project 51 be moved to FY 1993.

Further, Project 15 is different than Project 25, because it would deal with components; however, Project 25 would need to precede Project 15. Moving project 25 before 15 depends on how soon the databases are going to be developed. These projects are somewhat related to each other, but should be kept independent. System architecture is more related to interfaces, and is more conceptual in nature.

At this point, there was a discussion about whether the APTS committee can handle the system architecture issues or if a specific project is needed in the APTS Program. It was suggested that having a dedicated resource will generate a product, whereas the APTS committee would not be able to do more than critique the architecture. The key issues here are building the "hooks" into the architecture for transit because it will be interfaced with the highway architecture, and providing specific suggestions for architectures and producing reports, which the APTS Committee may not be able to do.

It was stated that the RF Smart Card project has been funded. It may be worthwhile to address the functional requirement of what the Smart Card should do in this project. Such a document may result from the current project on Smart Cards.

The discussion turned to information security and privacy concerns (Project 38). It was suggested that these issues could have significant impact on some of the other projects, so this Project should be moved into the FY 1993 projects. However, the title of the project should be changed from data security to "information security." Currently, AT&T is very sensitive to this kind of issue, and they have set up their own internal standards. There was some further discussion of Project 15. The key issue in this project is to get transit properties to compile their data in one place for vendor access. The Department of Commerce has shown interest in this since it addresses the issue of proprietary information. Right now in California there are 12 Traffic Operations Center (TOC) designs, and it could be that the San Francisco TOC's data couldn't be used in the Los Angeles TOC. This project should fully address that problem, as well as the problem of buying a software package for customer information,

having to upgrade it at a significant cost, or having to replace it with a whole new system entirely, which is expensive. This project will bring transit properties' raw data to one place in one format and will force more competition among vendors. The issue of software modularity was brought up as a possible addition to this Project. It was further suggested that for \$200,000 the layout of data structures could be developed, but comprehensive database design could not be accomplished.

It was stated that the U.S. Geological Survey (USGS) developed a transfer standard, which was adopted by the American National Standards Institute (ANSI), a graphic data transfer standard, a text transfer standard, and a spatial data transfer standard. IVHS America will choose one or more formats that will be able to be interfaced. Real-time data that will go on top of a map database is important, and will need to be addressed in the short-term. A suggestion was that layers be defined, analogous to isolayers for communication. The interfaces would be defined, as well as what goes on inside the layers.

Projects 18, 24 and 22 were discussed. It was suggested that real-time data services be added to a regional integrated information system. Then it was decided that these projects be kept separate now, but could be combined later for operational testing. (Project 19 already was merged with Project 18, since media is an element of integrated regional information services.)

Another comment was that there seemed to be an emphasis on software and traveler information. It was suggested that there be an emphasis on improving service, such as in Project 45, which gives transit priority in signalized networks, or in Project 42, which does dynamic routing. Another element of this improvement might be the coordination of paratransit service, such as timed transfer, and signal pre-emption (Projects 42, 45, and 35). It was stated that transit priority would not be constant (e.g., full and empty vehicles would be treated differently).

There was discussion about those projects that did not make the cut. Projects 27 and 35, which related to ADA did not make the cut. Further, Project 42 has an ADA implication. It was suggested that Project 23 be re-thought to include an actual test in a specific city in order to test scheduling algorithms. However, that kind of testing would have huge cost implications. Gorman Gilbert cautioned that the vendors would not be very cooperative and that the activity may not be valuable. FTA's concern regarding selecting one vendor over another is an important issue that may make this activity not feasible. However, it was suggested that the benchmarking process that is used in the software industry could be used in this case. For instance, a compiler developer will use standard tools that have been accepted by the industry to evaluate software. Also, the way the problem is set up could give a faulty result, making it hard to conduct an unbiased test.

A vote was taken to rate the projects (see the table at the end of this document). For the future, it was suggested that at least two or three years worth of projects be covered, rather than just one. The GMU facilitation process was very valuable, and should be used for future workshops.

As a matter of policy it was decided by the group that DOT should incorporate transit and other intermodal components into all IVHS operational tests to the maximum extent feasible, and that all eligible sources of funding should be utilized. It was suggested that the use of Section 3 for capital items in the operational tests be given priority.

Gorman Gilbert concluded by thanking all the participants and staff that contributed to the APTS breakout session.

The following are descriptions of proposed projects for FY 94-95.

1: Multi-use Smart Card \$1,000,000

To identify, evaluate the costs and benefits as well as the institutional barriers to introduction of multi-use Smart Cards by transit operators.

2: Radio Frequency (RF) Smart Card \$1,000,000

Determine costs and benefits as well as operational barriers to an RF system.

3: Smart Kiosks \$1,500,000

Operationally test a system of smart kiosks and real time bus schedule displays at bus stops.

- o Monetary value to rider of real-time information would be available at bus stops.
- o Value would accrue to the transit operator in terms of increased revenue because riders would have ready access to real-time information and therefore, would ride more often.
- o Reliability and durability would be determined of a real time information system.
- o Costs and barriers of implementing a real time information system would be learned, as well as ways to increase system performance and reduce capital and operating costs.
- o Evaluation of the advantages and disadvantages of competing systems could be made.

- 4: IVHS Impact on Ridership \$100,000
- Determine overall impact of IVHS technology on efficiency and ridership of transit and ridesharing. The technologies to be used are smart cards, smart buses, and other smart traveler related activities.
- 5: Suburban IVHS Implementation \$800,000
- Identify applications of IVHS technologies to changing travel patterns involving suburb-to-suburb commute. Review paratransit, ridesharing options where high density development does not occur. Include software and hardware requirements as well as a range of communication options. Operationally test applications in selected sites.
- 6: Marketing IVHS Technologies for Transit \$300,000
- Define and evaluate factors affecting ridesharing choice when using IVHS technology, including perceived risks and benefits. Define time-saving thresholds achieved as a result of using IVHS technologies. Define traveler preferences for circumventing congested routes as a non-driver.
- 7: Demographics for APTS \$100,000
- Define user groups based upon census data for travelers using IVHS technologies. Develop factors influencing choice of rideshare and transit.
- 8: Advanced Passenger Information Systems for Low Density Transit Systems \$275,000
- Passenger information systems that will aid urban transit passengers could be of assistance to low population density areas. Through interactive displays, passengers can learn of transit schedules and systems status and make appropriate travel plans.
- 9: Application of Smart Card Technology in Small Transportation Systems \$250,000
- Smart Cards, coupled with PINs, can do much to remove unauthorized use of transportation privileges. In small transportation systems, a cashless fare system could be important as there is greater difficulty in obtaining exact change and a lower level of security.
- 10: Use of Advanced Vehicle Location in Low Density Areas \$200,000
- Rural transportation can benefit from knowledge of location

of passengers and vehicles. Rural taxi services would be able to reach the requester quicker. Small buses and vans are often used, but service is hindered by inefficiency of physically locating riders. Volunteers are a low cost supplement to service, and have the same challenges in locating residences. Arranging match with volunteers could be facilitated with improved communications and data bases available in APTS. Emergency response and general travel are two principal areas in which AVL can benefit rural residents.

11: Maps On A Disk \$100,000

With GPS, computerized maps can replace paper road maps. Display in vehicle shows roads and features. The driver can purchase a micro-disk/CD/smart card which contains all the roads and features in an area and can enter destination GPS points which will compute and display alternative routes.

12: Private Sector Carpool Matching Service \$50,000

There may be a need for a centralized service to arrange for instant carpools. Participant background checks, driver record checks and assignment of people to individual carpools will require some sort of infrastructure organization to manage the operation. Project will define requirements for establishing centralized carpool service.

13: Definition and Demonstration of Alternative Ways to Determine Taxi Fare Calculation \$300,000

Currently taxi fare calculation is generally based on meters which calculate the distance driven and the time involved in a trip and can lead to driver abuse. This project would explore feasibility of and demonstrate use of a taxi fare system which uses GPS satellite positions to calculate fare.

14: Industry Days \$50,000

This would be formal presentations by people from industry. The goal is technology transfer. What would be discussed is costs, what worked and what didn't, and the technology used.

15: APTS Standard Database/Software \$200,000

This would include defining and publishing database standards. Proposed tasks for this project include:

- o Perform literature search of existing rideshare, paratransit dispatching, pre-trip planning and other multi-modal trip decision-making software.

- o Analyze and evaluate structure of related databases. Develop functional requirements for standard database structures which the various software packages could all utilize.
 - o Adopt and publish the standards developed.
- | | | |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 16: | Test to Reduce VMT using IVHS Technology | \$10,000,000 |
| 17: | Test AVL for Demand Response Transit | \$500,000 |
| 18: | Integrated Regional Information Services | \$2,500,000 |
| | Real-time transit status and fare information. Alternate routing during incidents. Real-time ridesharing and other flexible demand responses services. | |
| 19: | Media Use of IVHS | \$150,000 |
| | What approach can make media reports useable? | |
| 20: | Document Cross-cutting Lessons Learned | \$125,000 |
| | Capture, organize and document cross-cutting lessons learned and disseminate to community. | |
| 21: | Functional Component Libraries | \$500,000 |
| | Reusable hardware and software components for use of future developments for operational tests. | |
| 22: | Integrated Real-Time Operational Planning Passenger Information System | \$300,000 |
| 23: | Evaluation of Commercial Paratransit Scheduling Software | \$300,000 |
| 24: | Information Systems Design and Development in Mobility Manager Concept | \$150,000 |
| 25: | Coordinated Parallel Architectural Studies | \$750,000 |
| 26: | Fare Payment Justification Studies in Multi-Application Environment | \$150,000 |
| 27: | Test and Evaluate Radio Frequency Smart Card Fare Payment Medium for Paratransit Systems | \$500,000 |

Many patrons of these systems are handicapped; what kind of card is appropriate for these patrons? Need to identify that the person using the service is authorized to use the service.

- 28: Optimization of Timed Transfers in Transit Networks
\$700,000
- Use of information for control of arrivals at transfer centers, for dispatching at transportation centers for both fixed and flexible services.
- 29: Establish Formal Links Between Users and Developers
\$100,000
- 30: Operational Test for Use of Advanced Vehicle Information Systems Technologies to Authorize Use of HOV Lanes.
\$750,000
- 31: Mobility Manager Operational Tests
\$755,000
- 32: Operational Test of Sensor Technologies for HOV Lane Verification
\$1,000,000
- 33: Evaluate Use of Geographic Information Systems in Transit Systems
\$150,000
- Use in conjunction with advanced vehicle locating (AVL) technology, route design, ridership analysis and evaluation of geographic information systems software for transit use.
- 34: Debit Card Use for Fare Payment on Rail Systems
\$1,000,000
- Direct use of debit cards in fare gates as well as recording information on entry and exit in the system.
- 35: Test Using Paratransit as Feeder to Fixed Route Serving Disabled Passengers
\$2,000,000
- Will use AVL system to accomplish this.
- 36: Smartcard Telephone Reservation System for Use in Para-Transit
\$150,000
- Use card to download information to carrier (name, address, etc).
- 37: Integrating APTS Information for Short and Long Term Planning
\$180,000
- 38: Data Security
\$200,000
- Assessment of public sensitivity to privacy and information security issues as well as identification of mitigation efforts that will satisfy those concerns.

- | | | |
|-----|--------------------------------------------------------------------------------------|-------------|
| 39: | APTS Technology for Passenger Security | \$250,000 |
| | Using silent alarms, let passengers know if they are in an unsafe situation. | |
| 40: | Consortium of Transit Managers for Major Executive Review | \$200,000 |
| | To oversee and review program with maybe a different panel for each technology area. | |
| 41: | Fraud Deterrent Mechanism for Fare Payment Media | \$150,000 |
| | Deter counterfeiters, with encryption capability. | |
| 42: | Route Deviation Dynamic Stop Requests and Routing | |
| 43: | Timed Transfer Management | \$1,500,000 |
| 44: | Smart Card Fare Collection | \$1,500,000 |
| 45: | Transit Priority on Signalized Networks | \$1,500,000 |
| 46: | Accident Data Recording | \$1,500,000 |
| 47: | Real Time Ridesharing | \$1,500,000 |
| 48: | Taxi Management and User Side Subsidy with Smart Cards | \$1,500,000 |
| 49: | Urban Goods and Passenger Movement | \$1,500,000 |
| 50: | Rural ATIS Route Guidance System | \$1,500,000 |

ENGINEERING BREAKOUT SESSION

Chair-person: David Mikoryak, Vice President, Advanced Research & Development, Transportation Manufacturing Corporation

FTA Co-Chair: Steven Barsony

Facilitator: Samy Elias, Associate Dean for Engineering Research, University of Nebraska

FTA Staff: Jeffrey Mora

Recorder: Karla Karash, EG&G Dynatrend

Chairman Mikoryak stated the objective of this breakout session is to review and revise, as necessary, the list of FTA engineering projects and the proposed funding amounts. An end product will be a priority listing of projects for further consideration for FTA funding. The topic areas to be covered are:

1. Clean Air
2. Technology Development
3. Transit Accessibility

Steve Barsony provided an overview from the FTA perspective. In December of 1991, the Planning and Research Priorities Workshop followed the meeting of the Federal Technology Advisory Committee (FAC) which developed a list of six evaluation criteria for research. These criteria are:

- A. Reduce maintenance/operation costs;
- B. Increase ridership, enhance safety/security, improve access;
- C. Implement mandated legislative programs;
- D. Reduce weight/increase efficiency (of vehicles);
- E. Transfer technology, information dissemination; and
- F. Control capital costs.

In addition to the evaluation criteria, several strong and overriding recommendations were made. These were:

1. FTA must place more emphasis on technical assistance and information dissemination of research results, best practices, project results, reliable performance indicators, and other statistical data.
2. Projects leading to reduced operating costs and enhanced revenues should take priority over all other candidates.
3. Multi-modal system planning and transportation demand management are central to a program which promotes cost effective and balanced transportation solutions.

4. Demand management and applications of new Advanced Public Transportation System (APTS) technologies and services should focus on assisting the transit industry's response to such major legislative mandates as Clean Air Act Amendments and the Americans with Disabilities Act (ADA).
5. New transit technologies must be reintroduced into the mainstream of the TP&R Program in a reliable and timely manner.

Mr. Mikoryak asked Dr. Elias to facilitate the discussion. Dr. Elias asked for comments on the Six Year Plan, starting with Clean Air. Mr. DeMarco emphasized that new projects can be added to the list.

There was a discussion of the conflict between the weight of buses and alternative fuels such as compressed natural gas (CNG). Diesel buses are overweight to begin with. All fuels have drawbacks, and a low floor, light weight bus program may help. Also there are lighter materials now available which will help with the weight problem. It was noted that the Clean Air requirements work at cross purposes with all the criteria but C.

The following is a number of projects which were suggested:

- o Develop guidelines for doing clean air related audits.
- o Develop procedures, technology, whatever for roadway charging of electric power vehicles.
- o Develop electric trolley overheads with less visual impact. Also the maximum speed of the trolley buses needs to be improved to at least 50 miles per hour.
- o Develop fuel standards for liquid natural gas (LNG), CNG and methanol. Although this is not in the FTA purview, the group felt it should be flagged as a need, mostly in the area of overcoming institutional barriers. Also, there are problems with the supply of LNG.

Another institutional problem was the need for IVHS standards. This will require the cooperation of many agencies, as did other issues discussed in the workshop. But the problem is considered outside the function of this session.

Finally, several people felt the need to stand back from the project lists and look at broader concepts in order to rethink the task of moving people from A to B. It was suggested that we need an "Advanced Concepts Study". Because transit carries only around 3% of the commuters in the United States as opposed to much larger

percentages in Europe, transit systems in the U.S. cannot afford the cost of innovations, improvements or other mandated programs since they add costs and affect the systems' ability to perform. European systems have a much larger ridership base which helps justify the development and capital costs of improvements. In summary, several new projects were suggested under the Clean Air category. These were:

1. CNG weight of vehicles;
2. Audit guidelines;
3. Roadway powered vehicles;
4. Enhancements to existing electric vehicles such as aerial structure (visual impact) and high speed trolley bus overhead; and
5. Sources and supply of fuels.

In addition, there were also several projects suggested of a general nature:

1. Coordination of major programs and funding;
2. Overcoming institutional barriers, for instance fuel specifications;
3. IVHS protocols;
4. Fuel supply infrastructure availability; and
5. Advanced concepts study.

A question was asked if the FAC criteria were applied to the list of projects. Also a question was asked why operating and maintenance costs are higher than capital costs in the FAC priority list. It is unclear whether the suppliers have been rewarded for reducing operating and maintenance costs. Steve Barsony said that manufacturers and suppliers comprise 51% of the FAC membership and this may have affected the selection of projects.

Mr. Mikoryak then led the group in the development of a matrix to look at 21 priority engineering projects developed by the FTA staff and their relationship to the FAC evaluation criteria, and to the engineering subject areas of Clean Air, Technology Development and Transit Accessibility.

The group's homework Wednesday evening was to rank the top ten projects listed under Clean Air, Technology Development, and Transit Accessibility using the ranking sheet provided. Thursday morning new projects would be considered, and ratings revised and

combined. The following is this list along with the ID numbers assigned for purposes of ranking.

Clean Air

- | ID No. | Project Title |
|--------|---------------------------------------------------|
| 1. | Diesel Engine Rebuild |
| 2. | Research Projects to Lower Emissions |
| 3. | Fuel Cell/Battery Bus Development |
| 4. | Transit Facility Guidelines for Alternative Fuels |
| 5. | Clean Air Technical Briefs |
| 6. | Alternative Fuels Safety Review/Audit |
| 7. | AFI Demonstrations |
| 8. | AFI Data Collection & Evaluation |

Technology Development

- | ID No. | Project Title |
|--------|------------------------------------------------------|
| 9. | Light Weight, 40 Foot Bus |
| 10. | Light Weight, Small Bus |
| 11. | Non-Destructive Test |
| 12. | Computer Modeling of Train Operations |
| 13. | International Cooperative Program |
| 14. | Technology Development Studies |
| 15. | Technical Studies of Advanced Technical Applications |
| 16. | Advanced Technology R&D |
| 17. | Training & Outreach |

Transit Accessibility

- | ID No. | Project Title |
|--------|--------------------------------------------|
| 18. | Research Projects to Improve Accessibility |
| 19. | National Easter Seals Project |
| 20. | Technical Studies in Support of ADA |
| 21. | ADA Safety Review/Audit |

The first task on Thursday morning was to go around the room and add new projects to the original list. Some expressed the concern that there was not enough emphasis on rail projects in comparison to bus projects. Rail is now carrying or soon will carry as many passengers as bus and rail research should be given a higher priority than it presently is.

The following new projects were suggested.

- | ID No. | Project |
|--------|-----------------------------------------------------------------------|
| 22. | Study of the Pollution Impact of Cars versus Buses |
| 23. | Systems Approach to Fixed Guideways |
| 24. | Develop Standards and Incentives for Life Cycle Cost/Benefit Analysis |
| 25. | Impact Study of PRT Systems on Cities/Suburbs |

26. Study of Through-trip Time (Multi-modal Routing Analysis & Rationale)
27. Electric Energy Cost Reduction for Rail
28. Maintenance Cost Reduction for Rail (MIS, Reliability, Diagnostics)
29. Energy Management of Auxiliary Systems (Off-Peak) Rail (Hotel Power)
30. Environmental Mitigation Guidelines
31. Technology Transfer of IVHS & Implementation of Systems
32. Develop Automatic Surveillance System & Determine the Impact on Ridership
33. Innovative Guideway Design
34. Emergency Egress (ADA) on Fixed Guideways
35. Expert System Support for Operations and Maintenance (Simulators for Train & Bus)
36. Verification/Certification Standards for New Developments
37. Tactile & Visual Information System for ADA
38. Systems Level Project for IVHS
39. Evaluate New Material in New Structural Design
40. Funded Task Forces
42. Internal & External Combustion Engine Projects
42. LNG-Tankage & Pumps
43. Mobile Generator Set for Hotel Power
44. Noise Abatement Technology Transfer
45. Transportation Research Center
46. Technology Transfer Process/Procedure (for the National Labs and the Proposed Transportation Research Center)
47. Low-Floor Drive Train Components
48. Impact Study of Roadway Power Electric Vehicles
49. Report the Status of Light Weight Bus Development on GVWRs
50. Develop a Less Visible Catenary with Highspeed Capability
51. Establish Fuel Standards
52. Develop ATCS Interactive with Passenger Information Systems and MIS
53. Modern Electric Coupling Development Project
54. International Rail Technology Transfer
55. Technology Transfer-Collision Avoidance System
56. Develop Standards for Electric Vehicle Components

Following the development of the full list of projects, participant again ranked their top 10 projects. The following ranking was the result.

| ID | Project Description | Rank | Score |
|-----|-----------------------------------------|------|-------|
| 3. | Fuel Cell/Battery Bus Development | 1 | 93 |
| 9. | Light Weight, 40 Foot Bus | 2 | 89 |
| 16. | Advanced Technology R&D | 3 | 46 |
| 18. | Research to Improve Accessibility | 3 | 46 |
| 27. | Electric Energy Cost Reduction for Rail | 5 | 45 |

| ID | Project Description | Rank | Score |
|-----|--------------------------------------------------------------------------------------|------|-------|
| 10. | Light Weight, Small Bus | 6 | 39 |
| 19. | National Easter Seals Project | 7 | 37 |
| 12. | Computer Modeling of Train Operations | 8 | 33 |
| 52. | Develop ATCS Interactive with Passenger Information Systems and MIS | 8 | 33 |
| 2. | Research Projects to Lower Emissions | 10 | 32 |
| 11. | Non-Destructive Test | 11 | 31 |
| 57. | Establish Fuel Standards | 12 | 30 |
| 28. | Maintenance Cost Reduction for Rail (MIS, Reliability, Diagnostics) | 13 | 29 |
| 35. | Expert System Support for Operations and Maintenance (Simulators for Train & Bus) | 14 | 28 |
| 15. | Technical Studies of Advanced Technical Applications | 15 | 27 |
| 7. | AFI Demonstrations | 16 | 26 |
| 1. | Diesel Engine Rebuild | 17 | 25 |
| 6. | Alternative Fuels Safety Review/Audit | 17 | 25 |
| 14. | Technology Development Studies | 17 | 25 |
| 54. | International Rail Technology Transfer | 20 | 24 |
| 24. | Develop Standards and Incentives for Life Cycle Cost/Benefit Analysis | 20 | 24 |
| 8. | AFI Data Collection & Evaluation | 22 | 23 |
| 50. | Develop a Less Visible Catenary with Highspeed Capability (Trolley Bus) | 23 | 24 |
| 47. | Low Floor Drive Train Components | 24 | 19 |
| 13. | International Cooperative Program | 24 | 19 |
| 34. | Emergency Egress (ADA) on Fixed Guideways | 24 | 19 |
| 23. | Systems Approach to Fixed Guideways | 24 | 19 |
| 20. | Technical Studies in Support of ADA | 28 | 18 |
| 36. | Verification/Certification Standards for New Developments | 28 | 18 |
| 30. | Environmental Mitigation Guidelines | 30 | 16 |
| 40. | Funded Task Forces | 31 | 15 |
| 29. | Energy Management of Auxiliary Systems | 32 | 12 |
| 55. | Technology Transfer-Collision Avoidance System | 33 | 11 |
| 26. | Study of Through-trip Time (Multi-Modal Routing Analysis & Rationale) | 33 | 11 |
| 4. | Transit Facility Guidelines for Alternative Fuels | 35 | 10 |
| 31. | Technology Transfer of IVHS and Implementation of Systems | 35 | 10 |
| 33. | Innovative Guideway Design | 35 | 10 |
| 44. | Noise Abatement Technology Transfer | 38 | 8 |
| 25. | Impact Study of PRT Systems on Cities/Suburbs | 38 | 8 |
| 22. | Study of the Pollution Impact of Cars versus Buses | 38 | 8 |
| 53. | Modern Electric Coupling Development | 38 | 8 |
| 42. | LNG-Tankage & Pumps | 38 | 8 |

| ID | Project Description | Rank | Score |
|-----|---------------------------------------------------------------------------------------------------------------------|------|-------|
| 32. | Develop Automatic Surveillance System and Determine the Impact on Ridership | 43 | 6 |
| 48. | Impact Study of Roadway Powered Electric Vehicles | 43 | 6 |
| 56. | Standards for Electric Vehicle Components | 43 | 6 |
| 45. | Transportation Research Center - Mission/Charter/Definition | 43 | 6 |
| 5. | Clean Air Technical Briefs | 47 | 5 |
| 46. | Technology Transfer Process/Procedure (for the National Labs and the Proposed Transportation Research Center) | 47 | 5 |
| 17. | Training and Outreach for Technology Development | 49 | 4 |
| 37. | Tactile & Visual Information System for ADA | 49 | 4 |
| 39. | Evaluate New Material in New Structural Design | 51 | 3 |
| 21. | ADA Safety Review/Audit | 51 | 3 |
| 38. | Systems Level Project for IVHS | 53 | 2 |
| 43. | Mobile Generator Set for Hotel Power | 54 | 0 |
| 49. | Report the Status of Light-Weight Bus Development on GVWRs | 54 | 0 |
| 41. | Internal & External Combustion Engine Projects | 54 | 0 |

The participants followed an eight step process for reviewing priorities. These were:

1. Review of deliberations of previous engineering breakout session from the Planning and Research Priorities Workshop in December of 1991. Twenty one research areas were recommended at this workshop.
2. Review of the current status of the FTA Clean Air, Technology Development and Transit Accessibility programs.
3. Review of the FAC evaluation criteria for projects.
4. Development of a matrix of the December 1991 Engineering session priority research areas versus the FAC evaluation criteria.
5. Development of a matrix to determine if the December 1991 Engineering Session priority areas covered the assigned area responsibilities of Clean Air, Technology Development and Transit Accessibility.
6. Review of the proposed FTA projects for FY 1993 to determine which projects were considered from the December 1991 session, that the FAC evaluation criteria were applied and

which engineering topic areas were affected. The objective was to uncover major gaps where projects are needed to cover priority areas. In addition, duplicate projects were eliminated.

7. Projects for fiscal year 1993 were ranked based on the group's preferences.
8. New projects were suggested which would fill gaps in the research agenda, and all projects were reranked. Results were displayed, sorted and summed. The top 14 projects follow:
 - o Fuel Cell/Battery Bus Development;
 - o Light Weight, 40 Foot Bus;
 - o Advanced Technology R&D;
 - o Research Projects to Improve Accessibility;
 - o Electric Energy Cost Reduction for Rail;
 - o Light Weight, Small Bus;
 - o National Easter Seals Project;
 - o Computer Modeling of Train Operations;
 - o Develop ATCS Interactive with Passenger Information Systems and MIS;
 - o Research Projects to Lower Emissions;
 - o Non-destructive Test and Evaluation;
 - o Establish Fuel Standards;
 - o Maintenance Cost Reduction for Rail (MIS, Reliability, Diagnostics); and
 - o Expert System Support for Operations & Maintenance on Rail (Simulations for Train & Bus).

FINANCE BREAKOUT SESSION

Chair-person: Thomas McNichols, Manager, Finance and Administration, PACE

FTA Co-Chair: William Menczer

Facilitators: David Clawson, AASHTO
Dennis Louwerse, Berks Area Reading Transportation Authority
Eugene Skoropowski, Flour Daniel

FTA Staff: Edward Thomas

Recorder: Ann Tallon, EG&G Dynatrend

The Finance session opened with Chair-person Thomas McNichol welcoming the attendees and stating that the ultimate goal of the Workshop was to find ways that transit can acquire a larger share of the transportation market and better compete with the automobile. He also charged the group with reviewing and critiquing the Six Year Plan and proposed FY 1993 projects.

Administrator Clymer then spoke about two new developments in FTA:

1. Advanced Federal Draw Down - In the past, grantees had to produce local matching funds up front to qualify for federal grants. Now grantees will only have to demonstrate that they have been promised those funds. Historically, grant draw downs involved the federal and local shares. If projects are approved under this initiative, local money does not have to be provided until the end of construction.
2. Like/Kind Exchange (former equity swaps) - This allows a transit agency to use money received from the sale of used vehicles (when these vehicles have been purchased with Federal funds) as the local match to purchase like, new vehicles. In the past, the money was required to be returned to the government based on the government's share of the depreciated value of the vehicle. This new policy will not only stimulate the bus industry, but it will encourage better maintenance on the vehicles to be sold.

Mr. Clymer then held a brief question/answer session. Afterward, Edward Thomas described the elements of the Finance program. They are:

- o Financial planning,
- o Financial management,
- o Pricing and revenue collection, and
- o Joint development.

Then the three key themes to be addressed in the workshop were identified by Bill Menczer. These are:

- o Flexible Funding - Included are flexible funding issues under ISTEA, changes in planning such as requirements for financial plans for transportation improvement programs (TIPs) and long range plans (LRP), issues such as dedicated revenue, costs of system building and operations, revenue shortfalls, new funding sources and expanded criteria for new starts projects.
- o Fleet Acquisition - This theme is defined as financial issues associated with managing rolling stock. Some examples are the vehicle resale policy, leasing of assets using formula grant funding, pooled financing and pooled procurements.
- o Project Financial Management - This describes financial methods used to improve project development. Included are turnkey projects that demonstrate advancing new technology and lower construction costs and advance construction authorization under ISTEA.

The proposed FY 1993 projects were organized by theme and described and discussed in detail. Projects were ultimately listed under their specific program elements of Financial Planning, Financial Management, Public/Private Partnerships and Pricing and Revenue Collection. Using these as categories, the projects are described as follows:

Financial Planning

Financing with Federal Support \$100,000

The comment was made that this project, originally entitled "Financing with Federal Guarantees", should be renamed, as guarantees are opposed by OMB. Otherwise, the group responded favorably to the project.

Evaluations of Creative Financing \$200,000

There was a great deal of discussion surrounding this project. It was mentioned that this will be ongoing throughout FY 1993 and beyond. This project should focus on what factors have limited financial options and provide the present state of creative financing. It was noted that financial decisions should be no different in the transit industry than in other industries.

Transit Industry Financial Capacity Indicators \$100,000

This project proposes to develop some indices that could be used to help the government assess financial capacity.

Cost Benefit Analysis of Economic Impact of Transit on
Community \$100,000

Cost Impact of Federal Requirements on State & Local
Governments (ADA, CAA) \$100,000

Outreach on Flexible Funding \$250,000

The group was very supportive of this new project, noting that an outreach program to demonstrate sources of flexible funding will require strong FTA advocacy. Issues to be considered include the potential need for intermodal planning groups, the development of a single set of criteria for multi-modal tradeoff decisions and the need for immediate information dissemination on this subject.

Technical Support for Finance Program \$75,000
(same for Financial Planning, Financial Management,
Public/Private Partnerships, and Pricing & Revenue
Collection)

Financial Policy Research & Analysis \$125,000
(same for Financial Planning and Financial Management)

Financial Management

Comparative Analysis of FTA/FHWA Approval Processes \$100,000

The project will assess why FHWA appears to approve projects much faster than FTA.

Financial Policy Research & Analytical Support \$125,000
(same for Financial Planning and Financial Management)

Vehicle Replacement Cost Study \$175,000

Benefits of Pooling Finances, Equipment and Facilities
Leasing Study \$300,000

Technical Support for Finance Program \$75,000
(same for Financial Planning, Financial Management,
Public/Private Partnerships, and Pricing & Revenue
Collection)

MANAGEMENT BREAKOUT SESSION

Chair-person: Ronald L. Barnes, Deputy General Manager, Greater Cleveland Regional Transit Authority

FTA Co-Chair: Franz Gimmmler

Facilitator: William Hathaway, Volpe National Transportation Systems Center

FTA Staff: Chuck Morison

Recorder: Thomas Coleman, EG&G Dynatrend

This breakout session included the Human Resources, Safety and Security and Information Programs of FTA. The participants included state and local transportation officials, private consultants and FTA staff. There were two themes, training and information sharing, that were cross cutting issues for each of the three programs.

Training was directed at areas where individual transit authorities do not have programs which respond to Federal mandates. There are a number of Federal requirements such as ADA, safety, the environment, oversight, labor, drug and alcohol mandates. Information sharing through TSI, TRB, PPTN and collaboration with universities and colleges should be enhanced as well as should linkages with existing information systems.

An Urban Transit Assistance Program (UTAP) was proposed, following the model of RTAP. An urban program of technical support focusing on state activities directed at urban areas could incorporate both training and information sharing and assist in organizing and directing the many technical assistance activities now disconnected and underfunded.

It was noted that the FTA National Program had no program covering the broad area of management. Such a program existed prior to 1980. A strong consensus developed around the recommendation that such a focus area be established.

Safety and Security

The Office of Safety presented twenty projects for consideration in the FY 1993 program plan. These projects covered a range of activities from mandated safety oversight requirements to a number of initiatives in anticipation of FTA's final drug and alcohol rules. Four additional project ideas were suggested by the participants, including environmental safety issues, transit police, ADA, and bus safety components (such as windows that open from the outside and a universal shutdown switch).

The safety projects listed below were ranked in priority order by the workshop participants:

| | Score |
|-----------------------------------------------------------------------|-------|
| 1. Safe Handling of Alternative Fuels | 7.0 |
| 2. TSI Course Development | 6.8 |
| 3. Impact of ADA on Transit Employment | 6.7 |
| 4. System Safety Curriculum Upgrade | 6.5 |
| 5. Develop Training Program for Transit Impact on Environment | 6.2 |
| 6. Enforcement Strategies for Drugs and Alcohol | 6.1 |
| 7. Standardized Safety Components for Buses | 6. |
| 8. Employee Fitness for Duty Testing | 6. |
| 9. Police Management Training in Innovative Security | 5.9 |
| 10. Review/Evaluate Fire Detection Suppression Systems | 5.8 |
| 11. Grade Crossing Safety | 5.7 |
| 12. State Oversight Training on FTA Regulations | 5.7 |
| 13. Materials Fire Testing | 5.6 |
| 14. Reasonable Suspicion (drugs and alcohol) Training for Supervisors | 5.6 |
| 15. Human Factors | 5.3 |
| 16. Drug and Alcohol MIS | 5.2 |
| 17. Uniform Crime Statistics | 5.1 |
| 18. FTA Crime Report | 4.9 |
| 19. Pre-Employment Drug Screening for Small Operators | 4.8 |
| 20. Safety Management Information Statistics | 4.7 |
| 21. Drug and Alcohol Conference | 4.7 |
| 22. APTS Bus Collision Avoidance Program | 4.4 |
| 23. FTA State Oversight Procedures | 4.2 |
| 24. Rail Car Door Safety | 4.1 |

A number of issues were raised during the discussion of these projects:

- o Projects which involve the collection of any type of safety statistics or performance indicators raised concerns that this information may be used against transit authorities in legal proceedings. It was also suggested that management information systems be interactive in order to increase accessibility and exchange of information.
- o The APTS bus collision avoidance demonstration project raised some liability questions in the event of equipment or mechanical failure. This project would equip vehicles with devices which would alert drivers in time for alternative maneuvering to avoid rear-end collisions. It was stated that Greyhound Bus Lines has a

demonstration project underway in California. FHWA has data on the perceived benefit from this type of device and its use in mass transit systems.

- o Fire safety guidelines for materials used on transit vehicles should be addressed in collaboration with local fire departments. In addition, fire safety on paratransit vehicles and station evacuation have raised concerns regarding implementation of the ADA regulations.
- o Mechanical improvements in bus and rail doors to avoid passenger entrapment were raised as a safety issue. Although the severity of these occurrences is high, (e.g. wheelchair or baby carrier being closed in door), the probability of this type of incident occurring is very low.
- o FTA is required by the Omnibus Transportation Employee Act of 1991 to develop drug and alcohol regulations for safety sensitive employees. Although the projects presented were not enthusiastically embraced by the participants, FTA will provide the necessary documentation and training to assist mass transit authorities in implementing the requirements of this legislation.
- o Several participants questioned the high cost of the National Drug Conference. Alternative forms of teleconferencing are being considered in order to keep down the cost for this activity.
- o Management training courses were suggested for transit security police and police chiefs. It was suggested that conflict management training be developed which would address: the changing environment in the street (e.g. homelessness, gang violence), conflict avoidance and crisis intervention. An inventory of existing programs across the country and an analysis of successful initiatives in these areas should be undertaken.
- o Environmental safety and the safe handling of alternative fuels was given high priority by the participants.
- o An illness prevention plan and the identification of possible safety related illnesses or injuries for transit maintenance personnel was discussed.
- o Continued support for the Transportation Safety Institute's course curriculum was given a high priority ranking.

Human Resources

The following general comments were made about the Human Resources Program Plan:

- o Plan is vague and fragmented;
- o Linkages are missing;
- o Deals with many issues, activities, needs, problems; and
- o Lacks emphasis on process and structure.

There has never been an ongoing mechanism for human resources interests and advocates such as with PPTN. The plan should define a strategic process to guide ongoing planning and research activities and priorities in the human resources area. Process and structure is needed to overcome the gap between course material development and delivery mechanism.

The plan fails to mention critical cost issues associated with human resources. The highest rate of cost increase in transit budgets is found in the areas of worker compensation, health benefits and health insurance. The plan should address these issues strategically and suggest activities that the national program could undertake to deal with human resources cost containment.

Comments on Proposed Projects

1. Supervisory Training - There is a need/desire to bring unskilled workers up through supervisory ranks. Blue collar employees are an important source of talent for skilled jobs but need basic management skills. It would be useful to have outreach programs in order to implement courses already developed such as the Productivity and Supervisory Skills Course and Management and Productivity Skills Course. The National Transit Institute (NTI) has a role.
2. Skills Training - There is a need to make development opportunities available to the unskilled, diverse, entry level workforce. This can be done through a training program with the objective being to open up decision making positions to these employees. A college degree equivalency is the goal and an industry-wide certification program could contribute standards and transferability.
3. Management Sensitivity - Management should be sensitized to ongoing responsibilities and the opportunities to encourage and assist subordinates to develop themselves.
4. Training Network - Develop deliberate and careful plans to integrate and network existing institutions and

programs for human resource training. Existing junior colleges and other local teaching institutions have skills and desire. NTI should lead in development and facilitation of network and coordination of materials in use.

5. "Transit Colleges" - Promote the development of cooperative training programs at the local level. Encourage partnerships between local transit agencies and local teaching institutions; joint ongoing programs can serve both parties. NTI could lead as broker and technical support.
6. Human Resources Training Clearinghouse - Develop a dedicated clearinghouse for human resources training opportunities; this could include an annotated catalog (electronic or otherwise) and include training materials as well as scheduled training courses.
7. Total Quality Transit Management (TQTM) - Encourage productivity improvement through TQTM. This would facilitate a shift away from traditional hierarchical structures to a new, more productive, decentralized, team-based management structure. Documentation of efforts throughout industry regarding the application of TQM to transit, using the TRB "synthesis" type report, may be appropriate approach.
8. Training Strategy - Develop for transit a human resources training strategy and agenda to guide roles and goals. The market is characterized by many users and many providers, activities are decentralized and isolated. How should training needs be met? Who is best to provide the training? What are the roles and responsibilities of each and all parties?
9. ADA Employment - Study the impact of ADA on employment in the transit industry.
10. It was suggested that a national marketing research conference be held which allows the transit authorities to present demonstration projects which have enhanced their efficiency and expanded their passenger base.
 - o What is the effectiveness of their marketing tools?
 - o What causes the loss of ridership?
 - o Technology transfer, what works?

Information

Information has long been a critical component of transit operations. All too often information needs have been relegated to chance encounters or informal networks that are seldom complete

and current. Because of increasing job complexity, cost considerations are more important than ever before. Increased efficiency through better data and information access is a critical operational factor and will continue to be in the future. A more robust and accessible information network is required.

Critical questions to consider when conceptualizing a broad information network are:

1. What type of information is required? Who are the sources and customers?
2. Is there a good model to look at? Is it possible to emulate an existing and similar system?
3. What does the transit community use now? What hardware, software, and information exists?
4. What funding, at what level, will be needed to develop a system, procure hardware and software?

Comments on Proposed Plan

Explore the possibility of using public and private universities and colleges as conduits for information exchange. These may be "nodes" on local/state/regional networks. Look to the Department of Agriculture for precedents. This agency is one of the most successful in information exchange.

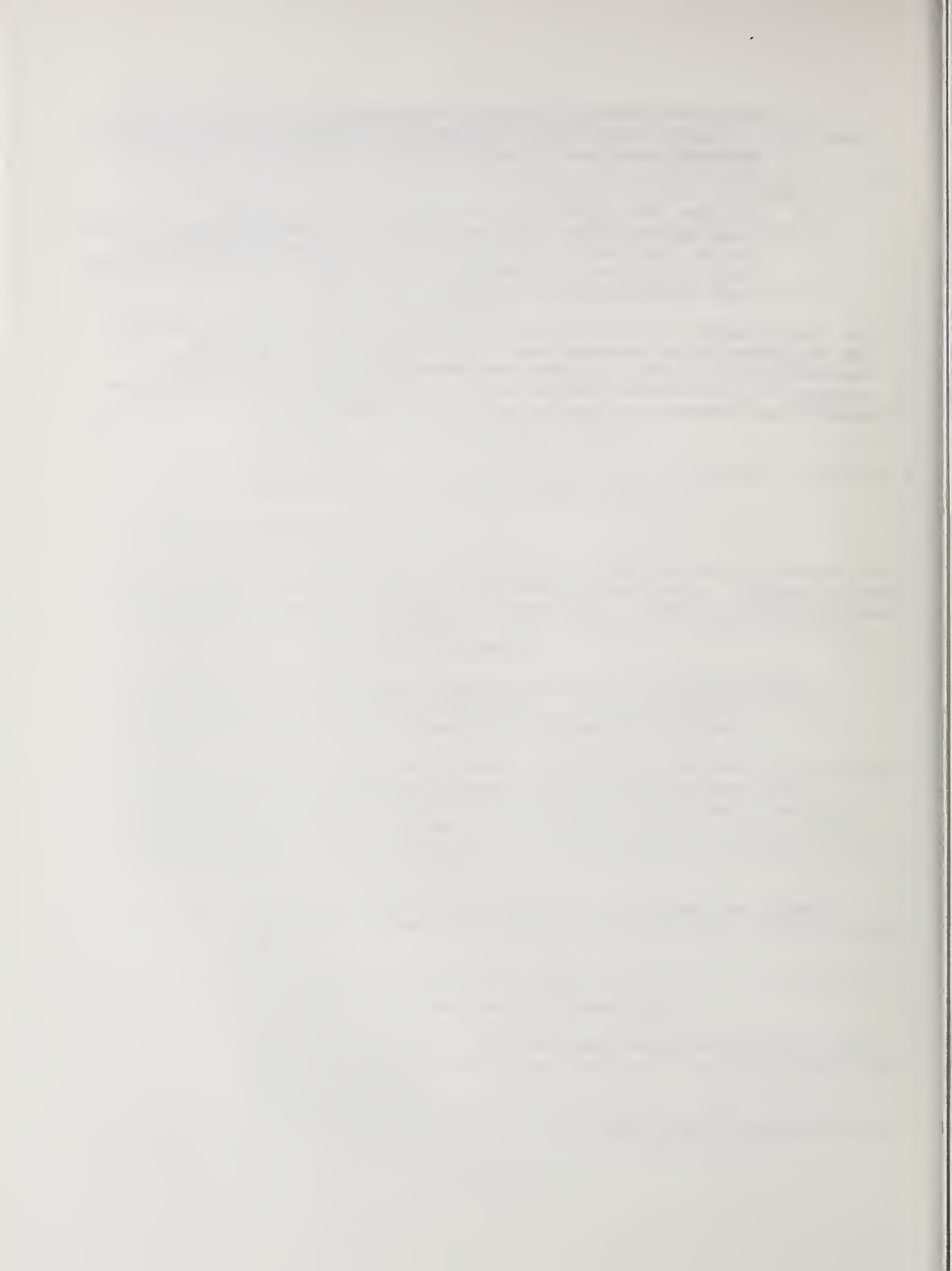
Establish a Urban Transportation Assistance Program (UTAP) modelled on the existing RTAP model. Expand support for the George Mason University Resource Information System.

Design a data/information network that is active and facilitates live information exchange between peers, researchers, and suppliers. Continue support for the Electronic Resource Center that was developed by Indiana University's Institute for Urban Transportation. The strengths of the Electronic Resource Center (ERC), include the following:

- o It was developed with major input from the transit industry to meet the industry's management information needs.
- o It has an agreement with APTA to convey all of APTA's electronically available information.
- o It is an on-line, computer-based system geared to the type of hardware most likely to be in the possession of transit systems.
- o It has bulletin board and electronic mail capabilities.

- o The Institute for Urban Transportation has some of the largest collections of transit information in the United States; this can be made available in conjunction with the ERC.
- o It has the capability to allow users to access information that is contained in documents by all of the words that are contained in those documents, not just key words that are assigned by a person who may not know that much about the transit industry.

The development of the hardware and software systems for the ERC was funded with a one-year grant from the Federal Transit Administration. This project is deserving of the continued support of the FTA as the ERC shows great promise in meeting the future information needs of the transit industry.



PLANNING BREAKOUT SESSION

Chair-person: Christine Johnson, New Jersey Department of Transportation

FTA Co-chair: Samuel Zimmerman

FTA Staff: Bert Arrillaga

Recorder: Joseph Coughlin, EG&G Dynatrend

Seven participants were in attendance; two from FTA, two from consulting firms, one from a state department of transportation, one from a university research center, and one from an engineering/construction management firm. The attendees acknowledged that the absence of a representative from a transit property or a metropolitan planning organization (MPO) was unfortunate and may present a bias in the recommendations developed. The group was confident, however, that it could identify the needs regarding broad planning issues. It was suggested that the detailed problems of bus operations planning would require a separate session and would not be dealt with at this time.

The Chair established four objectives for the participants:

- o Develop a vision as to the definition and mission of transit planning and project development program;
- o Assess the draft Six Year Plan;
- o Formulate new project recommendations where appropriate; and
- o Rank the recommended FY 1993 projects.

The discussion began with an attempt to reach a common understanding of what planning means in the context of transit. Upon review of the Six Year Plan it was agreed that the definition, as presented, neglected to clearly articulate the importance of the transit consumer or acknowledge the role of driving forces in the planning process. After some discussion, planning was defined as the thought process before the expenditure of money. As part of that thought process, the participants sought to identify those driving forces and strategic issues impacting the transit planning environment in the 1990's.

The following issues were identified:

- o The demand for multi-modal planning and related institutional and operational issues;

- o The presence and impact of new participants at the transportation planning table, such as environmental interests and newly empowered citizen groups result in a lack of common understanding about transportation issues;
- o The dawning of the "post-interstate" era where policy making, such as unwavering support for new highway construction, is inappropriate and planning for other than highway construction is more complicated;
- o New demographic factors such as an aging driving population, increased number of working women with children, the increase of automobile ownership, suburbanization, all pose new challenges and a new market for transit; and
- o The national priority on environmental quality and land use planning requires that the transit industry consider these in its service planning and new starts considerations.

After considering these strategic issues the attendees recommended that the goal of the Program be revised to read; "to provide planners with the tools, information, and data necessary to support multi-modal decision-making to improve public mobility and overall quality of life". Upon adopting this definition of planning and the importance of the strategic issues identified earlier, the participants developed five cross-cutting research themes to support their vision of planning. They were:

- o Multi-modal planning;
- o Improved planning communications for decision-makers and the public;
- o Management of time/cost uncertainty;
- o The role of transit on land use; and
- o Serving the new market.

Projects were proposed to support each of these research themes.

Multi-modal Planning - Too often highway and transit planning are done in a vacuum. The following projects were suggested:

- o Compare and integrate the FTA and FHWA alternatives analysis process.

- o Conduct an organizational study for multi-modal planning and project development. This study should identify an ideal organizational structure to facilitate multi-modal planning. A review of existing organizations or a synthesis of organizational constructs should be conducted.
- o Develop travel demand modeling and forecasting methods specifically for multi-modal planning. Current demand modeling data is customized toward a particular mode, e.g., transit or highway. Models should be developed to eliminate potential biases in mode alternative analyses.
- o Collect mode-neutral data to facilitate multi-modal planning and mode option evaluation.
- o Create a clearinghouse of information and provide training for multi-modal planning. Consideration should be given to expansion of the Federal role in technology transfer in order to ensure that the success and failure of multi-modal activities around the nation are widely disseminated.

Improved Planning Considerations - Effective planning requires that planners clearly articulate the costs and benefits of the options available to all government decision-makers, the public and affected interests. The following projects were suggested:

- o Develop improved measures that clearly communicate the value of transit project alternatives. Although cost/benefit language has been traditionally used to argue a particular alternative, the use of analogy or other means should be developed to communicate the range and potential impacts of transit options.
- o Techniques used in marketing and survey research should be applied to the transit industry, in order to better understand customer needs. Develop case studies that describe outreach methods and costs of reaching a "shared vision" of public expectations and possibilities in transit. Recognizing the introduction of new groups in the transportation planning community, it is important that methods be developed to engage all affected interests in a process that produces mutual understanding and common regional objectives.

Managing Time/Cost Uncertainty in Projects - An increased sensitivity to limits on financial resources in the public and private sectors dictate that cost containment strategies be

improved to control for time/cost uncertainties in project planning and construction. The following projects were suggested:

- o Develop contingency factors to be incorporated into a project to assess impacts of environmental requirements and complexity on time and cost.
- o Research what the "upset limits" ought to be for rethinking a project.
- o Explore the value and use of peer reviews to transportation project planning.
- o Document lessons learned from the private sector and other public operations on how risks affecting time and costs are managed.
- o Evaluate how the planning process might be modified to mitigate uncertainty/risk.

The Role of Transit on Land Use - Similar to other transportation alternatives, mass transit has significant impacts on land use, clean air, wetlands protection, noise and other environmental implications. Planners must be sensitized and provided with the tools to understand and assess these impacts.

- o Develop an approach to coordinating transportation planning with zoning and other traditional land use policies.
- o Update the Travel Time Budget Study.
- o Develop methods to assess land use impacts of new capacity.
- o Investigate the application of capacity-based planning to transit planning and land use.
- o Assess the viability of incentive programs for regions that develop "transit friendly" land use policies.
- o Conduct a comparative study of how other industrialized nations conduct transportation planning in concert with land use planning.

Service for the New Market - The new transit market is being driven by several demographic factors; among them are age, suburbanization, increased automobile ownership and the increase in the number of special markets. A series of market studies ought to be conducted to assess the impacts of these changes on mass transit. Topics for investigation include:

- o Conduct a study on what has happened to the transit industry since the 1980s.
- o Investigate traveller mode choice decisionmaking, such as how do various TDM and employer incentive programs impact traveller decisions.
- o Develop improved forecasting techniques to assess the "non-captive/suburban" market and its prospects for mass transit.
- o Identify the emerging needs of special market segments, e.g., women, the elderly.
- o Assess the utility of state-of-the-art computing and statistical validity of travel demand models to planning in the new market environment.

SERVICES BREAKOUT SESSION

Chair-person: Jim Sims, President, Commuter Transportation Services, Inc.

FTA Co-Chair: Walter Kulyk

Facilitators: Sally Cooper, Virginia Department of Transportation
Eric Marx, COMSIS

FTA Staff: Joseph Goodman

Recorder: Russell Thatcher, EG&G Dynatrend

RIS Operator: Barbara Emmert, National Center for Regional Mobility

The session proceedings were greatly enhanced by the assistance of staff from the National Center for Regional Mobility (NCRM). The Resource Information System (RIS) developed by the NCRM was used to make real-time changes to the Six-Year Plan and to tabulate the ranking of projects.

At the beginning of the Wednesday morning session, Jim Sims asked all in attendance to introduce themselves and to provide a brief description of their work and interests. Jim then distributed a schedule for the two day session and noted that the primary tasks of the group were to review the Regional Mobility chapter in the Six Year Plan, to discuss and rank potential FY 1993 projects and to provide guidance on the development of a program for FY 1994 and beyond. Next, Mr. Sims provided an overview of Chapter VI of the Six Year Plan. He summarized each of the five components of the program and reviewed the objectives and goals of each component.

The group spent a considerable amount of time reviewing the Six Year Plan. Numerous changes were made to the background statement, the definition of the problem and to the descriptions of each of the five program components. With the assistance of staff from George Mason University, the draft Plan was displayed on a screen for the group and wording changes were made in real-time as the discussion proceeded. This allowed for a revision of the Six Year Plan to be prepared by the end of the day and for the new document to be copied and distributed to session participants on Thursday.

In general, the group felt that the Plan needed to be changed in the following ways:

- o More emphasis needs to be placed on improving mobility. The social and economic benefits of improving mobility need to be recognized in addition to benefits such as improved air quality and fuel savings. The group felt that the focus of the program should be on moving people rather than moving vehicles.
- o There is a need to integrate public transportation with land use planning, site planning and development. Transportation demand management efforts need to be integrated into the local master planning process. The program should focus on preventing problems as well as on responding to and solving problems.
- o The artificial distinctions between rural, suburban and urban issues and needs should be removed from the chapter. For example, the draft plan identifies the lack of mobility as a rural issue and limits its discussion to other problems such as congestion and air quality in urban areas. A lack of mobility is also, however, a problem for elderly persons, persons with disabilities and the poor in urban areas. Similarly, efforts in rural areas need to focus on more than just mobility issues. In addition, urban congestion is a significant barrier to mobility.
- o The chapter should highlight improved service quality as an important benefit and goal of the program. It should be recognized that regional mobility efforts can improve the quality of transportation services in addition to increasing productivity, capacity and cost-effectiveness.

Significant changes made to each Section of the Plan as a result of the discussion included:

Background Statement - It was agreed that the first sentence in this statement would indicate that the goal of the program is to improve service quality as well as maintain and improve mobility. It was recommended that approaches used to meet program goals should include cost-effective measures and not just low cost measures.

It was noted that regional mobility problems have a social and economic development impact in addition to traffic and environmental impacts. It was agreed that, while social and economic issues are secondary to DOT's primary mission, the link between regional mobility and these broader benefits needs to be recognized throughout the chapter.

Problem Statement - In keeping with the above discussion, the first five paragraphs of the problem statement were restructured. The main purpose of these changes was to place greater emphasis on

the issue of increasing mobility, to recognize the social and economic benefits of the program and to recognize that mobility is a problem affecting people in both urban and rural areas.

There was also considerable discussion about the fact that development is oriented to the automobile and that there is a need to integrate public transportation into site planning and urban and suburban development. A sentence highlighting that "new developments were built without regard for the availability of public transportation, adequate attention to transit sensitive land use design, or the capacity of area roads" was added.

It was suggested that, in addition to citing statistics on the slowed growth of highway capacity, a comparative statistic on the growth in demand for travel during this same period would be helpful. In addition to noting that demand for private transportation is outstripping highway capacity, the group agreed that the report should note that there is no commitment to build more highway capacity in the future. There was discussion that perhaps highway capacity can be increased through APTS and other measures, but that the real issue was that there will not be the resources to add lane miles.

Finally, it was pointed out that regional mobility solutions are often hindered by institutional and regulatory barriers. A paragraph highlighting this aspect of the problem was added to the section.

The Regional Mobility Program - A comment was made that training was not included as one of the five approaches used to encourage local adoption of low cost, innovative strategies for solving regional mobility problems. In response to this comment, it was pointed out that NTI is a mechanism for training. Also, training is an activity within all of the components of the program.

There was some discussion on the integration of transit and land use and site planning. This integration needs to take place as part of Transportation Demand Management (TDM) efforts. It was noted that a better fit to land use and site planning would be achieved through projects funded under the Planning program. Strategies for integrating transit with land use and site planning were discussed. Because planning and development are local and state issues not directly controlled by federal laws or regulations, it was felt that information dissemination and training were particularly important and perhaps the most effective means of achieving this goal.

It was suggested that the title "Competitive Services" could easily be misinterpreted to mean competition between modes rather than competitive contracting for services. Thought should be given to a different name for this component of the program.

In order to clearly indicate that each component of the program employed a variety of activities, a paragraph contained in the last part of the chapter was moved to this introductory section. It noted that each component area included the following activities:

- o Research/Studies;
- o Demonstration Projects;
- o Project Evaluations;
- o Technical Assistance and Training; and
- o Outreach/Information Sharing.

Several changes were made to the overall objectives of the Regional Mobility Program. These included:

- o Encouraging considerations for land use and site design, particularly in the traffic impact analysis process as well as encouraging less dependence on single-occupant auto travel and alternative means of travel;
- o Advocating multi-modal and intermodal decision-making to increase mobility by increasing transportation services and reducing traffic congestion;
- o Stimulating the introduction of new transportation services by both the private and public sectors;
- o Improving both the productivity and quality of transportation services; and
- o Improving mobility for disadvantaged populations in all areas, not just in rural areas. A new objective, to improve information dissemination on new and innovative projects in regional mobility, was also added.

Program Components - The descriptions of each of the components of the Regional Mobility Program were reviewed and discussed. The discussion focused on goals and objectives. At the outset of this discussion there was a question about the difference between the "Competitive Services" component and "Entrepreneurial Services". It was explained that "Competitive Services" concerned public entities considering "buy" or "make" decisions. The "Entrepreneurial Services" program is intended to develop services that are tailored to the marketplace and which can be supported in the marketplace.

While there were a number of editorial changes made to the descriptions, goals, and objectives of each component area, the major changes made included:

- o Expanding TDM goals to include shaping future demand through better land use and site planning;
- o The need to attract additional, choice riders as a goal of the Innovative Transportation Services component;
- o Consider regulatory and institutional flexibility as a means of encouraging innovative transportation services;
- o Add "Examine and test information and communications technologies that enhance and improve transportation services" as an objective of the Innovative Transportation Services component;
- o Expand the goals of the Competitive Services component to include improved performance, productivity, and quality through the market forces of competition;
- o Change the emphasis of the description of the Competitive Services component to the expansion of resources through the participation of the private sector rather than simply promoting private sector participation;
- o Identify new job and economic development opportunities as a goal of the Entrepreneurial Services program;
- o The Entrepreneurial Services Program should include adequate start-up funding and training in order to foster participation by small, neighborhood-oriented providers; and
- o Add "Improve the operating capabilities of rural and specialized public transportation programs" as an objective of the Rural and Specialized Transportation component.

The group turned its attention to developing and ranking projects for FY 1993. A total of twenty-eight projects were ranked. This included the twenty-three projects on the FTA list as well as five new projects proposed by the group. Each project was explained and comments about the projects were invited. A brief summary of each project is also provided at the end of this chapter.

New projects in the TDM area are Transit-Oriented Land Use Practices Documentation and Study Impact of Insurance on Vanpools. The consensus was that the following projects should be given priority for FY 93:

- o Program Support;
- o National Center for Regional Mobility;
- o Joint FHWA/FTA Operational Action Program;

- o Evaluation of TDM Project Effectiveness;
- o Consortium for Regional Mobility;
- o Transit-Oriented Land Use Practices Documentation; and
- o Employer-Supported Transportation Demonstrations.

It was suggested that the "Employer-Supported Transportation Demonstrations" project might be combined with the "Joint FHWA/FTA Operational Action Program" as long as the goals of the former do not get lost in the larger FHWA/FTA effort. It was also suggested that alternative ways to accomplish the "Transit-Oriented Land Use Practices" study should be explored. This might include funding as a project in the planning area. It might also be accomplished by another agency or association through the Consortium for Regional Mobility.

Several participants expressed a concern that projects needed to include more available advanced technologies. There was particular interest in technologies that would assist in matching potential riders and that would be multi-modal. There was also a concern, however, that adding technology could dramatically increase project cost. As one way to offset higher capital cost, it was suggested that the program consider tapping 3(a)(1)(C) funds.

The group felt that the descriptions of all of these highly recommended projects needed to be strengthened, particularly the description of the "Evaluation of TDM Project Effectiveness".

New projects in the Innovative Transportation Services area include telecommuting assessment, study of existing fixed route deviation programs and study of electric vehicle applications. Projects which were ranked as a high priority (7 or better) in the Innovative Transportation Services area included:

- o Charter Bus Demonstration Support;
- o Congestion Pricing Studies and Demonstrations;
- o Telecommuting Assessment;
- o Transportation Allowance; and
- o Centralized Automated Trip Planning System.

It was suggested that the "Congestion Pricing Studies and Demonstrations" project include the development of a price elasticity model that could be used to predict the impact of changes in tolls on total toll receipts. This could help improve bond ratings by removing uncertainty about the impact that congestion pricing might have on project financing.

It should be noted that all projects received a fairly high grading. There was some disappointment that the "Electric Vehicle Application Study" and the "Fixed Route/Demand Responsive Bus Demonstrations" had been ranked relatively low. These are real tests of new ideas and there was a general consensus that this

area should focus on action projects and on demonstrating new concepts. There was general agreement that these two projects should be considered if possible. It was pointed out that a number of agencies and associations concerned with the Clean Air Act are spending a lot of money on sponsoring electric vehicle development and demonstrations. It was unclear, however, if these other studies and demonstrations would test the type of use being proposed here.

In the Entrepreneurial Services area, the "Weed and Seed" project, seen as a broad, interagency effort, was ranked as a high priority.

In the Rural and Specialized Transportation Services area, the projects receiving the highest ranking included:

- o Support for the National RTAP Program;
- o Minnesota Dial-A-Ride Technology;
- o Multi-State Transportation Coordination Initiative; and
- o Kansas Statewide Coordination.

The remaining project "Designing Data Collection Methodology" also ranked relatively high even though it received just less than a seven (which was the break point for a high ranking)

Compliance with the provisions of the Americans with Disabilities Act (ADA) must also be considered in all projects that are funded. Information and communications systems used to improve regional mobility must meet the needs of persons with hearing impairments or vision impairments. Alternative modes, such as vanpools, must be designed to meet the needs of persons with disabilities.

The group strongly advocated additional funding for Regional Mobility projects. Consensus was that Regional Mobility is directly in line with ISTEA requirements for congestion relief, mobility, inter-modalism and clean air mandates. The purpose of the ISTEA is clearly enunciated in its statement of policy:

"to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner."

Regional mobility is also where ideas and concepts developed in Planning, APTS and other areas can be integrated and applied.

The group did not recommend specific projects for FY 94 and beyond. Instead, there were several general suggestions regarding the future development of the program. These included:

- o Many of the projects for FY 1993 will need continuation and follow-on in FY 1994 and beyond. These should receive priority.

- o The success of many projects depends on adequate follow-on funding.
- o There needs to be a clean delineation between the TCRP and the National Program. TCRP should focus on local operator based issues and the National Program should have a nation wide focus.
- o Increase efforts to solicit and fund ideas and projects from states and local agencies. A flexible demonstration program, with adequate funding, should be considered. This program should clearly define regional mobility goals and objectives and outline basic project categories but should allow for innovative new ideas to be generated.
- o Future funding for the Program should be developed from a percentage takedown from available funding against the National portion of the TP&R program. It was suggested that this be at a minimum, 10% to 15%. This takedown should then be distributed according to the following allocations: 25% on program support, 30% on concept definition and 45% on operational testing and evaluation. This concept will allow for better long-range planning and stability in the Regional Mobility Program.

A suggestion was made that technical assistance to planning groups for the implementation of ISTEA provisions might be worthwhile. It was noted, however, that significant planning assistance is already provided through FTA's Grants Management Office.

The following are descriptions of the projects considered in this breakout session.

| | |
|----------------------------------|-----------|
| Transportation Demand Management | \$230,000 |
|----------------------------------|-----------|

This effort will provide a variety of technical support to FTA staff in the conduct of the Regional Mobility Program. Project concepts will be identified and developed into workable demonstration projects. Assistance will be provided in site identification. This effort will also include support in preparing for and holding conferences, seminars, symposia and workshops.

| | |
|---------------------------------------|-----------|
| National Center for Regional Mobility | \$350,000 |
|---------------------------------------|-----------|

This project will further develop and refine the National Center for Regional Mobility at George Mason University. The continuing role of the Center will be to link academic research to real problems, involve interested groups in creative decision making processes, relieve regional congestion and educate the public.

The Center will also continue to develop a computer assisted system to collect and disseminate technical information on a national level, to and from the transit industry.

Consortium for Regional Mobility \$150,000

This project will further develop and refine ways in which mobility could be enhanced in increasingly congested suburban areas. Activities to be undertaken include outreach through conferences, workshops and newsletters; identify and assist constituents of the member organizations in improving mobility, and disseminate information on the results of regional mobility projects.

Joint FHWA/FTA Operational Action Program \$500,000

This will be the third year for this program to fund innovative intermodal projects to improve regional mobility and mitigate traffic congestion and improve air quality. It is anticipated that FHWA will match FTA funding. Projects will be selected from among a number of candidates. Likely candidates include IVHS, smart traveler themes and innovative ridesharing arrangements.

Evaluation of TDM Project Effectiveness \$300,000

This project will evaluate a selected sample of 6 to 10 TDM projects. The evaluations would focus on the effectiveness of various TDM techniques, cost per person diverted from single occupant vehicles and institutional other issues.

Employer Supported Transportation Demonstrations \$100,000

Selected demonstrations will be conducted that show how employer supported TDM strategies can reduce traffic congestion and improve mobility. Techniques to be tested include employer distribution and subsidy of transit passes or vouchers; employer paid transportation allowances in lieu of subsidized parking; the introduction of variable work hours programs such as compressed work weeks, flextime and staggered hours; parking pricing strategies to encourage ridesharing; and employer sponsorship of commute services, shuttle buses and guaranteed ride home programs.

TDM Training Course \$150,000

The objective of this course will be to train state and local officials so that they can utilize a wide range of TDM measures in their efforts to comply with recent legislation. Jointly funded with FHWA, it is planned to offer 10 courses. The alternative is to subsidize existing private sector courses to reduce the cost of TDM courses. The key is to get to decision makers at the local level.

Vanpool Implementation Guidance Materials \$20,000

The state-of-the-practice in vanpooling programs has changed significantly since the last guidance materials were produced in 1980. The use of mini-vans, early-start programs, low interest loan programs and van/transit pass programs are just a few of the many innovations that have taken place over the last decade. This project will prepare a synthesis report of experience with vanpooling since 1980 and prepare a guidance document to assist transit and traffic engineering professionals and private employers/developers in implementing innovative vanpooling

Cash Travel Allowances for Parking \$200,000

Market pricing of parking is believed to be the key to TDM effectiveness. The most effective TDM projects have generally involved requiring employees to pay market rates for parking. Some trade-off in terms of extra compensation in lieu of a parking subsidy is usually necessary to make this policy palatable to workers. This project will test the effectiveness of a cash travel allowance by eliminating the subsidy for employee parking. The project will then be evaluated to determine the cost-effectiveness of the concept.

Study Impact of Insurance on Vanpools \$100,000

Many vanpool program coordinators have reported that the cost and availability of insurance has become an important issue in recent years. This project would identify and define the impact that insurance is having on vanpool programs. The project would also examine solutions that have been developed by vanpool operators as well as by the insurance industry. A manual or checklist that can assist states, the insurance industry, and vanpool operators in addressing this issue will be developed.

Transit-oriented Land Use Practices Documentation \$75,000

This project will document current practices around the nation that would improve land use zoning and site design that promotes greater transit usage, and decrease single occupancy auto usage.

Charter Bus Demonstration Support \$150,000

This project will provide technical support to FTA staff in the conduct of the congressionally mandated charter bus demonstration program. The demonstration program will investigate the service and economic impacts on private charter operators of implementing regulations designed to enable public transit operators to provide charter-services to governmental, civic, charitable, and other community organizations. The results of this demonstration program should provide Congress and the FTA with data to determine the most effective method for providing charter services to local

communities, and whether current regulations are in need of modification.

Centralized Automated Trip Planning System \$200,000

This project will demonstrate the feasibility of implementing a centralized automated trip planning system in a large urban area, with different transit modes and many different transit service operators. The system will enable each transit operator to provide its customers with multi-modal transit information in a timely, consistent and comprehensive manner.

Congestion Pricing Studies and Demonstrations \$250,000

Special studies and demonstrations are necessary to determine the effectiveness and viability of congestion pricing techniques. Typical demonstration projects that are being considered include region wide versus. corridor toll pricing, use of innovative road-pricing technologies, graduated pricing experiments to smooth peak period travel and improving transit alternatives through redistributing revenues from tolled corridors.

Telecommuting Demonstrations \$200,000

Telecommuting reduces and can eliminate the need to travel to and from work. These projects will further the state of knowledge about telecommuting. The evaluation of these projects will serve to provide more substantive information on the effectiveness of telecommuting and reduce resistance to further introduction of this concept. A typical demonstration will involve developing, implementing and assessing an innovative means of telecommuting such as through establishing satellite telecommuting work centers.

Guaranteed Ride Home Evaluation \$150,000

A guaranteed ride home system is designed to overcome the fear of transit-riding or ride-sharing workers being stranded at work if they cannot return home at their regular time. Usually an arrangement is made with a taxi company to provide subsidized taxi rides home to eligible preregistered commuters. This evaluation will provide answers to the question of how effective is a guaranteed ride home program in promoting a modal shift toward more efficient multi-occupant vehicles.

Mobility Match \$200,000

This project will determine the feasibility and viability of developing and implementing a mobility match concept. This concept (similar to the old dial-a-ride) is to provide a guaranteed ride to and from work for suburban commuters in shared vehicles through a subscription program.

Fixed Route Demand Responsive Bus Demonstration \$150,000

This project will consider a fixed route, demand responsive bus service in two locations. The project will determine the feasibility of implementing an innovative bus service plan. The plan will incorporate consideration of an advanced public transportation system (APTS) as it relates to dispatching and deviating from fixed-route buses to demand-response services.

Transportation Allowance \$20,000

One of the most innovative pricing mechanisms to be developed over the last few years has been the transportation allowance programs. These programs provide unique opportunities for employers to offer employee equitable transportation benefits, without giving an incentive to those who choose to drive alone. Little documentation exists on implementing these programs. This project will prepare a synthesis report of experience with transportation allowances since 1980 and prepare a guidance document to assist transit and traffic engineering professionals and private employers/developers in implementing these programs.

Baseline and Assessment of Telecommuting Projects \$75,000

This is to be a five year program. The first year is intended to establish a baseline for telecommuting at telecommuting centers and at home. Existing projects would have an evaluation and assessment activity to transportation impacts, examine process, look at outcomes, determine employer/employee attitudes, legal aspects, and other attributes as needed. The research methodology would be delineated, metrics developed and described and process metrics examined. A state-of-the-art handbook will be produced that can be used as a guide for the marketing, implementation and management of future telecommuting projects.

Study Electric Vehicle Applications \$75,000

Develop initial concept and market study. Evaluate impact of electric vehicles. Look at impact on clean air, employer mandates, etc. Project is an opportunity to contribute to the design of electric vehicles.

Study of Fixed Route Deviation Programs and Impact on Paratransit and Fixed Route Operations \$75,000

Many public transit entities in rural and small urban areas are changing their services from traditional fixed route to route deviation. Very little information exists on designing route deviation systems and on predicting the impact that route deviation has on fixed route operation. Several successful route deviation services do exist. This study would collect service information on these programs and evaluate the impact that route deviation has on headways, fixed route ridership and paratransit

ridership. A report will be prepared which describes existing programs and which offers suggestions for designing a route deviation service.

Weed and Seed Program

\$200,000

Weed and Seed is a multi-agency initiative designed on the premise that Federal, state, and local governments and community groups can work together to reclaim neighborhoods embattled by drugs, crime, unemployment and substandard levels of education, health and housing. The effort will focus on intensive law enforcement; social service program elements to improve education, housing, health, transportation, and job skills; and business tax credits on specific urban neighborhoods. It is expected that potential employers will be attracted by the tax incentives, by the safer environment provided through law enforcement and community policing, and by an improved, ready-to-work labor force. FTA's involvement will include providing demonstration grants for reverse commute services that link targeted communities with jobs that are not otherwise accessible via public transit.

Rural Transportation Assistance Program (RTAP)

\$1,000,000

The RTAP National Program provides funding for training, technical assistance, and research to improve the delivery of transit services in rural areas. Funding in this fiscal year will also provide for additional demonstrations or studies of rural service enhancements. These include the following:

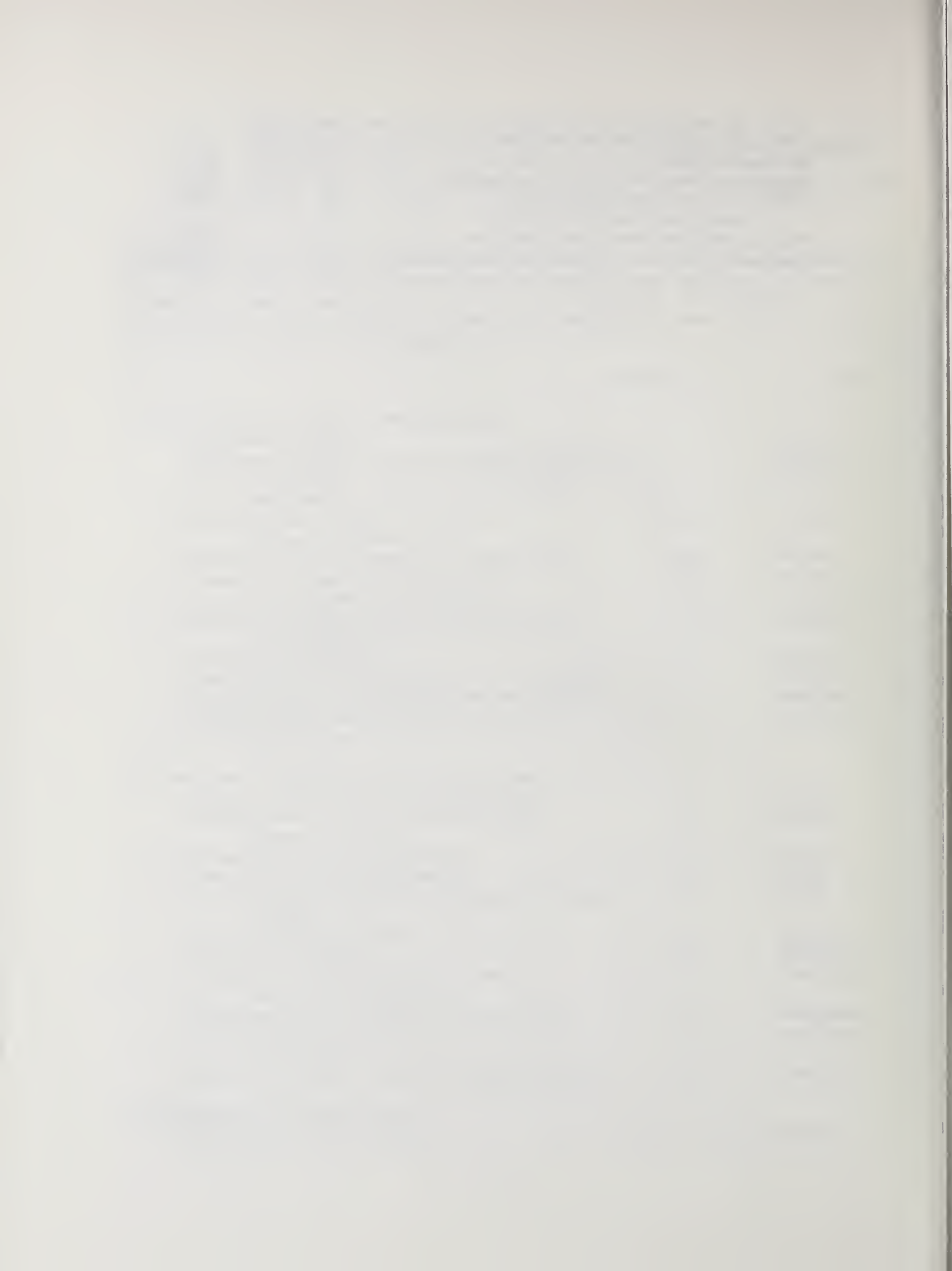
1. State of Kansas statewide coordination and allocation plan for passenger transportation in rural and small urban areas. The goal of the project is to develop a plan which provides for efficient coordinated delivery of transportation services in the state through Coordinated Transit Districts.
2. The State of Montana along with the States of Wyoming, North and South Dakota, Nevada and Utah will identify the level and type of transportation activity within each State. The project will also review the funding of local agencies by state HHS and DOT departments.
3. In Minnesota, rural demand responsive transit systems are being caught between the potential conflicting goals of providing quality transportation to all people at any time and operating within the parameters of static budgets. If these transit systems are to continue providing quality service within realistic budgets, low cost alternatives to service expansion must be found. The purpose of the demonstration project will be to test the feasibility of using a computerized dispatching system in anywhere from one to four systems with capacity problems.

4. The Commonwealth of Puerto Rico will design and implement a data collection methodology for the Publico Transit System. This methodology will focus on collection of data regarding passenger trips, miles and other data required for the Section 15 System.

The following is the ranking of the proposed projects. No projects were ranked as a "low" priority. It was the feeling of the group that all projects had merit and were worthy of funding. However, given the reality of limited funding, the group identified those projects from each component area which it felt were most worthy of funding in FY 93.

| Projects | Ranking | Priority |
|---------------------------------------|---------|----------|
| Transportation Demand Management | | |
| Program Support | 9 | High |
| National Center for Regional Mobility | 9 | High |
| Joint FHWA/FTA Operational Action | 9 | High |
| Program | | |
| Evaluation of TDM Project | 8.9 | High |
| Effectiveness | | |
| Consortium for Regional Mobility | 7.9 | High |
| Transit-Oriented Land Use | 7.8 | High |
| Practices Documentation | | |
| Employer-Supported Transportation | 7.6 | High |
| Demonstrations | | |
| Training Course | 7.3 | High |
| Cash Travel Allowances for Parking | 7 | High |
| Study Impact of Insurance on Vanpools | 6.8 | Medium |
| Vanpool Implementation Guidance | 6 | Medium |
| Materials | | |
| Innovative Transportation Services | | |
| Charter Bus Demonstration Support | 9 | High |
| Congestion Pricing Studies and | 8.4 | High |
| Demonstrations | | |
| Telecommuting Assessment | 8.1 | High |
| Transportation Allowance | 7.6 | High |
| Centralized Automated Trip Planning | 7.3 | High |
| System | | |
| Telecommuting Demonstrations | 6.9 | High |
| Mobility Match | 6.6 | Medium |
| Study of Existing Fixed Route | 6.6 | Medium |
| Deviation Programs | | |
| Guaranteed Ride Home Evaluation | 6.4 | Medium |
| Fixed Route/Demand Responsive | 5.4 | Medium |
| Bus Demos | | |
| Study Electric Vehicle Applications | 5.4 | Medium |
| Entrepreneurial Services | | |
| Weed and Seed Program | 9 | High |

| | | |
|---------------------------------------|-----|--------|
| Rural Transit Assistance Program | | |
| National RTAP | 9 | High |
| Minnesota Dial-A-Ride Technology | 8.5 | High |
| Multi-State Transportation | 8 | High |
| Coordination Initiative | | |
| Kansas Statewide Coordination | 7.3 | High |
| Designing Data Collection Methodology | 6.8 | Medium |



TRANSIT PLANNING AND RESEARCH PRIORITIES WORKSHOP

TYCOONS CORNER, VIRGINIA

15-16 JULY, 1992

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Breakout Session: Management

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Breakout Session: Planning

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Breakout Session: Services

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Breakout Session: Management

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Breakout Session:

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Breakout Session:

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Breakout Session:

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Breakout Session: Finance

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Breakout Session: Management

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Breakout Session: Planning

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